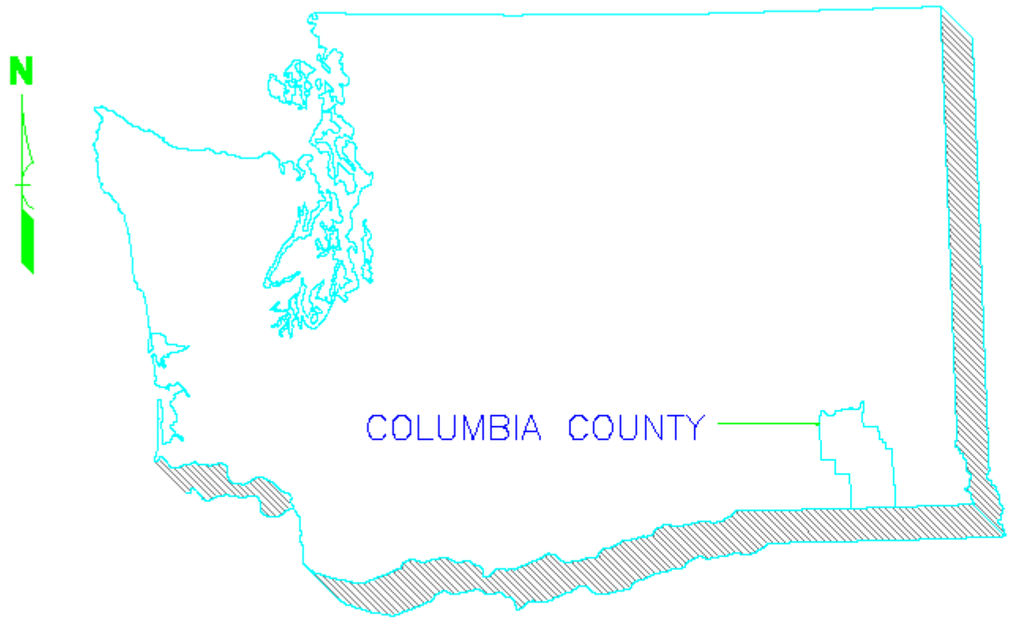
# Appendix A- Drawing Set

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## General Notes

1) The attached Construction and Material Specifications are part of this plan and shall govern this installation.
2) This installation shall be constructed to the lines and grades as shown on the drawings and detailed in the construction specifications.
3) Construction activities will be conducted in a manner that minimizes soil, water and air pollution.
4) Construction acitivities will be conducted in a manner consistent with all safety regulations for work necessary for this installation.

## Utilities

The Engineer does not make any representation to the existence or non-existence of any public and private buried and overhead utilities. Where utilities are shown on the drawing there location and depth or height is approximate. The exact location and depth or height shall be determined by the responsible utility. Any work within the utility easement will conform to the requirements of the utility.

LANCE B. HORNING
STATE OF WASHINGTON
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REGISTERED
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Date
Designed L. Horning 3/20/23
Drawn L. Horning 3/20/23
Checked L. Horning 3/20/23
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PA 34—Habitat Restoration
Tucannon River
Columbia Conservation District
--Preliminary--

Water Resources Engineer
Columbia Conservation District
Dayton, WA

File Name PA 34
Drawing No.

Sheet 1 of 12

**HIP III GENERAL CONSERVATION MEASURES APPLICABLE TO ALL ACTIONS:**
THE ACTIVITIES COVERED UNDER THIS CONSULTATION ARE INTENDED TO PROTECT AND RESTORE FISH AND WILDLIFE HABITAT WITH LONG-TERM BENEFITS TO ESA-LISTED SPECIES. HOWEVER, PROJECT CONSTRUCTION ACTIVITIES HAVE SHORT-TERM ADVERSE EFFECTS TO ESA-LISTED SPECIES AND THEIR CRITICAL HABITATS. TO MINIMIZE THESE SHORT-TERM ADVERSE EFFECTS AND MAKE THEM PREDICTABLE FOR PURPOSES OF PROGRAMMATIC ANALYSIS, BPA PROPOSES THE FOLLOWING GENERAL CONSERVATION MEASURES FOR USE AS APPLICABLE TO EACH PROJECT.

**DOCUMENTATION:** TO BE POSTED ONSITE BY THE CONTRACTOR IN A LOCATION VISIBLE TO THE PUBLIC.
1) NAME(S), PHONE NUMBER(S), AND ADDRESS(ES) OF THE PERSON(S) RESPONSIBLE FOR OVERSIGHT.
2) A DESCRIPTION OF HAZARDOUS MATERIALS THAT WILL BE USED, INCLUDING INVENTORY, STORAGE, AND HANDLING PROCEDURES.
3) PROCEDURES TO CONTAIN AND CONTROL A SPILL OF ANY HAZARDOUS MATERIAL GENERATED, USED OR STORED ON-SITE, INCLUDING NOTIFICATION OF PROPER AUTHORITIES.
4) A STANDING ORDER TO CEASE WORK IN THE EVENT OF HIGH FLOWS EXCEPT AS NECESSARY TO MINIMIZE RESOURCE DAMAGE (ABOVE THOSE ADDRESSED IN THE DESIGN AND IMPLEMENTATION PLANS) OR EXCEEDANCE OF TAKE OR WATER QUALITY LIMITATIONS.

**INSPECTIONS AND MONITORING:** PROJECT SPONSOR STAFF OR THEIR DESIGNATED REPRESENTATIVE WILL PROVIDE IMPLEMENTATION MONITORING TO ENSURE COMPLIANCE WITH THIS BIOLOGICAL OPINION, INCLUDING:
1) GENERAL CONSERVATION MEASURES AND PROJECT DESIGN CRITERIA ARE ADEQUATELY FOLLOWED; AND
2) EFFECTS TO ESA-LISTED SPECIES ARE NOT GREATER THAN PREDICTED AND TAKE LIMITATIONS ARE NOT EXCEEDED.

**STATE AND FEDERAL PERMITS:** ALL APPLICABLE REGULATORY PERMITS AND OFFICIAL PROJECT AUTHORIZATIONS WILL BE OBTAINED BEFORE PROJECT IMPLEMENTATION. THESE PERMITS AND AUTHORIZATIONS INCLUDE, BUT ARE NOT LIMITED TO, NATIONAL ENVIRONMENTAL POLICY ACT, NATIONAL HISTORIC PRESERVATION ACT, AND THE APPROPRIATE STATE AGENCY REMOVAL AND FILL PERMIT, ARMY CORPS OF ENGINEERS 404 PERMITS, AND ASSOCIATED 401 WATER QUALITY CERTIFICATIONS.

**TIMING OF IN-WATER WORK:** APPROPRIATE STATE (OREGON DEPARTMENT OF FISH AND WILDLIFE(ODFW), WASHINGTON DEPARTMENT OF FISH AND WILDLIFE (WDFW), OR IDAHO DEPARTMENT OF FISH AND GAME (IDFG), GUIDELINES FOR TIMING OF IN-WATER WORK WINDOWS (IWW) WILL BE FOLLOWED. THE NEED FOR ISOLATION AND DEWATERING WILL ALSO BE EVALUATED WHEN DETERMINING THE APPROPRIATE IWW FOR THE SPECIES AFFECTED. EXCEPTIONS TO ODFW, WDFW, OR IDFG, IN-WATER WORK WINDOWS WILL BE PROCESSED USING THE VARIANCE PROCEDURES DESCRIBED ON THIS SHEET:
- ODFW (OREGON DEPARTMENT OF FISH AND WILDLIFE) 2008. OREGON GUIDELINES FOR TIMING OF IN-WATER WORK TO PROTECT FISH AND WILDLIFE RESOURCES. AVAILABLE AT: HTTP://WWW.DFW.STATE.OR.US/LANDS/INWATER/OREGON_GUIDELINES_FOR_TIMING_OF_%20INWATER_WORK%2008.PDF
- WDFW (WASHINGTON DEPARTMENT OF FISH AND WILDLIFE) 2010. TIMES WHEN SPAWNING OR INCUBATING SALMONIDS ARE LEAST LIKELY TO BE WITHIN WASHINGTON STATE FRESHWATERS. AVAILABLE AT: HTTP://WDFW.WA.GOV/LICENSING/HPA/FRESHWATER_INCUBATION_AVOIDANCE_TIMES_2MAY2010.PDF

**SITE LAYOUT AND FLAGGING:** PRIOR TO CONSTRUCTION, THE ACTION AREA WILL BE CLEARLY FLAGGED TO IDENTIFY THE FOLLOWING:
1) SENSITIVE RESOURCE AREAS, SUCH AS AREAS BELOW ORDINARY HIGH WATER, SPAWNING AREAS, SPRINGS, AND WETLANDS;
2) EQUIPMENT ENTRY AND EXIT POINTS;
3) ROAD AND STREAM CROSSING ALIGNMENTS;
4) STAGING, STORAGE, AND STOCKPILE AREAS; AND
5) NO-SPRAY AREAS AND BUFFERS.

**TEMPORARY ACCESS ROADS AND PATHS:**
1) EXISTING ACCESS ROADS AND PATHS WILL BE PREFERENTIALLY USED WHENEVER REASONABLE, AND THE NUMBER AND LENGTH OF TEMPORARY ACCESS ROADS AND PATHS THROUGH RIPARIAN AREAS AND FLOODPLAINS WILL BE MINIMIZED TO LESSEN SOIL DISTURBANCE AND COMPACTION, AND IMPACTS TO VEGETATION.
2) TEMPORARY ACCESS ROADS AND PATHS WILL NOT BE BUILT ON SLOPES WHERE GRADE, SOIL OR OTHER FEATURES SUGGEST A LIKELIHOOD OF EXCESSIVE EROSION OR FAILURE. IF SLOPES ARE STEEPER THAN 30%, THEN THE ROAD WILL BE DESIGNED BY A CIVIL ENGINEER WITH EXPERIENCE IN STEEP ROAD DESIGN.
3) THE REMOVAL OF RIPARIAN VEGETATION DURING CONSTRUCTION OF TEMPORARY ACCESS ROADS WILL BE MINIMIZED. WHEN TEMPORARY VEGETATION REMOVAL IS REQUIRED, VEGETATION WILL BE CUT AT GROUND LEVEL (NOT GRUBBED).
4) AT PROJECT COMPLETION, ALL TEMPORARY ACCESS ROADS AND PATHS WILL BE OBLITERATED, AND THE SOIL WILL BE STABILIZED AND REVEGETATED. ROAD AND PATH OBLITERATION REFERS TO THE MOST COMPREHENSIVE DEGREE OF DECOMMISSIONING AND INVOLVES DECOMPACTING THE SURFACE AND DITCH, PULLING THE FILL MATERIAL ONTO THE RUNNING SURFACE, AND RESHAPING TO MATCH THE ORIGINAL CONTOUR.
5) TEMPORARY ROADS AND PATHS IN WET AREAS OR AREAS PRONE TO FLOODING WILL BE OBLITERATED BY THE END OF THE IN-WATER WORK WINDOW.

**TEMPORARY STREAM CROSSINGS:**
1) EXISTING STREAM CROSSINGS WILL BE PREFERENTIALLY USED WHENEVER REASONABLE, AND THE NUMBER OF TEMPORARY STREAM CROSSINGS WILL BE MINIMIZED.
2) TEMPORARY BRIDGES AND CULVERTS WILL BE INSTALLED TO ALLOW FOR EQUIPMENT AND VEHICLE CROSSING OVER PERENNIAL STREAMS DURING CONSTRUCTION.
3) VEHICLES AND MACHINERY WILL CROSS STREAMS AT RIGHT ANGLES TO THE MAIN CHANNEL WHEREVER POSSIBLE.
4) THE LOCATION OF THE TEMPORARY CROSSING WILL AVOID AREAS THAT MAY INCREASE THE RISK OF CHANNEL RE-ROUTING OR AVULSION.
5) POTENTIAL SPAWNING HABITAT (I.E., POOL TAILOUTS) AND POOLS WILL BE AVOIDED TO THE MAXIMUM EXTENT POSSIBLE.
6) NO STREAM CROSSINGS WILL OCCUR AT ACTIVE SPAWNING SITES, WHEN HOLDING ADULT LISTED FISH ARE PRESENT, OR WHEN EGGS OR ALEVINS ARE IN THE GRAVEL. THE APPROPRIATE STATE FISH AND WILDLIFE AGENCY WILL BE CONTACTED FOR SPECIFIC TIMING INFORMATION.
7) AFTER PROJECT COMPLETION, TEMPORARY STREAM CROSSINGS WILL BE OBLITERATED AND THE STREAM CHANNEL AND BANKS RESTORED.

**STAGING, STORAGE, AND STOCKPILE AREAS:**
1) STAGING AREAS (USED FOR CONSTRUCTION EQUIPMENT STORAGE, VEHICLE STORAGE, FUELING, SERVICING, AND HAZARDOUS MATERIAL STORAGE) WILL BE 150-FEET OR MORE FROM ANY NATURAL WATER BODY OR WETLAND, OR ON AN ADJACENT, ESTABLISHED ROAD AREA IN A LOCATION AND MANNER THAT WILL PRECLUDE EROSION INTO OR CONTAMINATION OF THE STREAM OR FLOODPLAIN.
2) NATURAL MATERIALS USED FOR IMPLEMENTATION OF AQUATIC RESTORATION, SUCH AS LARGE WOOD, GRAVEL, AND BOULDERS, MAY BE STAGED WITHIN THE 100-YEAR FLOODPLAIN.
3) ANY LARGE WOOD, TOPSOIL, AND NATIVE CHANNEL MATERIAL DISPLACED BY CONSTRUCTION WILL BE STOCKPILED FOR USE DURING SITE RESTORATION AT A SPECIFICALLY IDENTIFIED AND FLAGGED AREA.
4) ANY MATERIAL NOT USED IN RESTORATION, AND NOT NATIVE TO THE FLOODPLAIN, WILL BE REMOVED TO A LOCATION OUTSIDE OF THE 100-YEAR FLOODPLAIN FOR DISPOSAL.

**EQUIPMENT:**
1) MECHANIZED EQUIPMENT AND VEHICLES WILL BE SELECTED, OPERATED, AND MAINTAINED IN A MANNER THAT MINIMIZES ADVERSE EFFECTS ON THE ENVIRONMENT (E.G., MINIMALLY-SIZED, LOW PRESSURE TIRES; MINIMAL HARD-TURN PATHS FOR TRACKED VEHICLES; TEMPORARY MATS OR PLATES WITHIN WET AREAS OR ON SENSITIVE SOILS). GAS-POWERED EQUIPMENT WITH TANKS LARGER THAN 5 GALLONS WILL BE REFUELED IN A VEHICLE STAGING AREA PLACED 150-FEET OR MORE FROM A NATURAL WATERBODY OR WETLAND, OR IN AN ISOLATED HARD ZONE, SUCH AS A PAVED PARKING LOT OR ADJACENT, ESTABLISHED ROAD.
2) ALL VEHICLES AND OTHER MECHANIZED EQUIPMENT WILL BE:
   a) STORED, FUELED, AND MAINTAINED IN A VEHICLE STAGING AREA PLACED 150-FEET OR MORE FROM ANY NATURAL WATER BODY OR WETLAND OR ON AN ADJACENT, ESTABLISHED ROAD AREA;
   b) INSPECTED DAILY FOR FLUID LEAKS BEFORE LEAVING THE VEHICLE STAGING AREA FOR OPERATION WITHIN 150-FEET OF ANY NATURAL WATER BODY OR WETLAND; AND
   c) THOROUGHLY CLEANED BEFORE OPERATION BELOW ORDINARY HIGH WATER, AND AS OFTEN AS NECESSARY DURING OPERATION, TO REMAIN GREASE FREE.

**EROSION CONTROL:** EROSION CONTROL MEASURES WILL BE PREPARED AND CARRIED OUT, COMMENSURATE IN SCOPE WITH THE ACTION, THAT MAY INCLUDE THE FOLLOWING:
1) TEMPORARY EROSION CONTROLS WILL BE IN PLACE BEFORE ANY SIGNIFICANT ALTERATION OF THE ACTION SITE AND APPROPRIATELY INSTALLED DOWNSLOPE OF PROJECT ACTIVITY WITHIN THE RIPARIAN BUFFER AREA UNTIL SITE REHABILITATION IS COMPLETE.
   a) IF THERE IS A POTENTIAL FOR ERODED SEDIMENT TO ENTER THE STREAM, SEDIMENT BARRIERS WILL BE INSTALLED AND MAINTAINED FOR THE DURATION OF PROJECT IMPLEMENTATION.
   b) TEMPORARY EROSION CONTROL MEASURES MAY INCLUDE FIBER WATTLES, SILT FENCES, JUTE MATTING, WOOD FIBER MULCH AND SOIL BINDER, OR GEOTEXTILES AND GEOSYNTHETIC FABRIC.
   c) SOIL STABILIZATION UTILIZING WOOD FIBER MULCH AND TACKIFIER (HYDRO-APPLIED) MAY BE USED TO REDUCE EROSION OF BARE SOIL IF THE MATERIALS ARE NOXIOUS WEED FREE AND NONTOXIC TO AQUATIC AND TERRESTRIAL ANIMALS, SOIL MICROORGANISMS, AND VEGETATION.
   d) SEDIMENT WILL BE REMOVED FROM EROSION CONTROLS ONCE IT HAS REACHED 1/3 OF THE EXPOSED HEIGHT OF THE CONTROL.
   e) ONCE THE SITE IS STABILIZED AFTER CONSTRUCTION, TEMPORARY EROSION CONTROL MEASURES MUST BE REMOVED.
2) EMERGENCY EROSION CONTROLS WILL BE AVAILABLE AT THE WORK SITE AND INCLUDE THE FOLLOWING:
   a) A SUPPLY OF SEDIMENT CONTROL MATERIALS; AND
   b) AN OIL-ABSORBING FLOATING BOOM WHENEVER SURFACE WATER IS PRESENT.


**DUST ABATEMENT:** THE PROJECT SPONSOR WILL DETERMINE THE APPROPRIATE DUST CONTROL MEASURES (IF NECESSARY) BY CONSIDERING SOIL TYPE, EQUIPMENT USAGE, PREVAILING WIND DIRECTION, AND THE EFFECTS CAUSED BY OTHER EROSION AND SEDIMENT CONTROL MEASURES. IN ADDITION, THE FOLLOWING CRITERIA WILL BE FOLLOWED:
1) WORK WILL BE SEQUENCED AND SCHEDULED TO REDUCE EXPOSED BARE SOIL SUBJECT TO WIND EROSION.
2) DUST-ABATEMENT ADDITIVES AND STABILIZATION CHEMICALS (TYPICALLY MAGNESIUM CHLORIDE, CALCIUM CHLORIDE SALTS, OR LIGNINSULFONATE) WILL NOT BE APPLIED WITHIN 25-FEET OF WATER OR A STREAM CHANNEL AND WILL BE APPLIED SO AS TO MINIMIZE THE LIKELIHOOD THAT THEY WILL ENTER STREAMS. APPLICATIONS OF LIGNINSULFONATE WILL BE LIMITED TO A MAXIMUM RATE OF 0.5 GALLONS PER SQUARE YARD OF ROAD SURFACE, ASSUMING A 50:50 (LIGNINSULFONATE TO WATER ) SOLUTION.
3) APPLICATION OF DUST ABATEMENT CHEMICALS WILL BE AVOIDED DURING OR JUST BEFORE WET WEATHER, AND AT STREAM CROSSINGS OR OTHER AREAS THAT COULD RESULT IN UNFILTERED DELIVERY OF THE DUST ABATEMENT MATERIALS TO A WATERBODY (TYPICALLY THESE WOULD BE AREAS WITHIN 25-FEET OF A WATERBODY OR STREAM CHANNEL; DISTANCES MAY BE GREATER WHERE VEGETATION IS SPARSE OR SLOPES ARE STEEP).
4) SPILL CONTAINMENT EQUIPMENT WILL BE AVAILABLE DURING APPLICATION OF DUST ABATEMENT CHEMICALS.
5) PETROLEUM-BASED PRODUCTS WILL NOT BE USED FOR DUST ABATEMENT.

**SPILL PREVENTION, CONTROL, AND COUNTERMEASURES:** THE USE OF MECHANIZED MACHINERY INCREASES THE RISK FOR ACCIDENTAL SPILLS OF FUEL, LUBRICANTS, HYDRAULIC FLUID, OR OTHER CONTAMINANTS INTO THE RIPARIAN ZONE OR DIRECTLY INTO THE WATER. ADDITIONALLY, UNCURED CONCRETE AND FORM MATERIALS ADJACENT TO THE ACTIVE STREAM CHANNEL MAY RESULT IN ACCIDENTAL DISCHARGE INTO THE WATER. THESE CONTAMINANTS CAN DEGRADE HABITAT, AND INJURE OR KILL AQUATIC FOOD ORGANISMS AND ESA-LISTED SPECIES. THE PROJECT SPONSOR WILL ADHERE TO THE FOLLOWING MEASURES:
1) A DESCRIPTION OF HAZARDOUS MATERIALS THAT WILL BE USED, INCLUDING INVENTORY, STORAGE, AND HANDLING PROCEDURES WILL BE AVAILABLE ON-SITE.
2) WRITTEN PROCEDURES FOR NOTIFYING ENVIRONMENTAL RESPONSE AGENCIES WILL BE POSTED AT THE WORK SITE.
3) SPILL CONTAINMENT KITS (INCLUDING INSTRUCTIONS FOR CLEANUP AND DISPOSAL) ADEQUATE FOR THE TYPES AND QUANTITY OF HAZARDOUS MATERIALS USED AT THE SITE WILL BE AVAILABLE AT THE WORK SITE.
4) WORKERS WILL BE TRAINED IN SPILL CONTAINMENT PROCEDURES AND WILL BE INFORMED OF THE LOCATION OF SPILL CONTAINMENT KITS.
5) ANY WASTE LIQUIDS GENERATED AT THE STAGING AREAS WILL BE TEMPORARILY STORED UNDER AN IMPERVIOUS COVER, SUCH AS A TARPAULIN, UNTIL THEY CAN BE PROPERLY TRANSPORTED TO AND DISPOSED OF AT A FACILITY THAT IS APPROVED FOR RECEIPT OF HAZARDOUS MATERIALS.

**INVASIVE SPECIES CONTROL:** THE FOLLOWING MEASURES WILL BE FOLLOWED TO AVOID INTRODUCTION OF INVASIVE PLANTS AND NOXIOUS WEEDS INTO PROJECT AREAS:
1) PRIOR TO ENTERING THE SITE, ALL VEHICLES AND EQUIPMENT WILL BE POWER WASHED, ALLOWED TO FULLY DRY, AND INSPECTED TO MAKE SURE NO PLANTS, SOIL, OR OTHER ORGANIC MATERIAL ADHERES TO THE SURFACE.
2) WATERCRAFT, WADERS, BOOTS, AND ANY OTHER GEAR TO BE USED IN OR NEAR WATER WILL BE INSPECTED FOR AQUATIC INVASIVE SPECIES.

**WORK AREA ISOLATION & FISH SALVAGE:** ANY WORK AREA WITHIN THE WETTED CHANNEL WILL BE ISOLATED FROM THE ACTIVE STREAM WHENEVER ESA-LISTED FISH ARE REASONABLY CERTAIN TO BE PRESENT, OR IF THE WORK AREA IS LESS THAN 300 FEET UPSTREAM FROM ACTIVE SPAWNING HABITATS.
1) WHEN WORK AREA ISOLATION IS REQUIRED, ENGINEERING DESIGN PLANS WILL INCLUDE ALL ISOLATION ELEMENTS, FISH RELEASE AREAS, AND, WHEN A PUMP IS USED TO DEWATER THE ISOLATION AREA AND FISH ARE PRESENT, A FISH SCREEN THAT MEETS NMFS'S FISH SCREEN CRITERIA (NMFS 2011C, OR MOST CURRENT).
2) WORK AREA ISOLATION AND FISH CAPTURE ACTIVITIES WILL OCCUR DURING PERIODS OF THE COOLEST AIR AND WATER TEMPERATURES POSSIBLE, NORMALLY EARLY IN THE MORNING VERSUS LATE IN THE DAY, AND DURING CONDITIONS APPROPRIATE TO MINIMIZE MORTALITY FOR THE SPECIES PRESENT.
3) SALVAGE OPERATIONS SHALL FOLLOW THE ORDERING, METHODOLOGIES, AND CONSERVATION MEASURES SPECIFIED BELOW IN STEPS 1 THROUGH 8. STEPS 1 AND 2 WILL BE IMPLEMENTED FOR ALL PROJECTS WHERE WORK AREA ISOLATION IS NECESSARY ACCORDING TO CONDITION 1(A) ABOVE. ELECTROFISHING (STEP 3) CAN BE IMPLEMENTED TO ENSURE ALL FISH HAVE BEEN REMOVED FOLLOWING STEPS 1 AND 2, OR WHEN OTHER MEANS OF FISH CAPTURE MAY NOT BE FEASIBLE OR EFFECTIVE. DEWATERING AND REWATERING (STEPS 4 AND 5) WILL BE IMPLEMENTED UNLESS WETTED IN-STREAM WORK IS DEEMED TO BE MINIMALLY HARMFUL TO FISH, AND IS BENEFICIAL TO OTHER AQUATIC SPECIES. DEWATERING WILL NOT BE CONDUCTED IN AREAS OCCUPIED BY LAMPREY, UNLESS LAMPREYS ARE SALVAGED USING GUIDANCE SET FORTH IN USFWS BEST MANAGEMENT PRACTICES TO MINIMIZE ADVERSE EFFECTS TO PACIFIC LAMPREY.

**STEP 1: ISOLATE.**
(1) BLOCK NETS WILL BE INSTALLED AT UP AND DOWNSTREAM LOCATIONS AND MAINTAINED IN A SECURED POSITION TO EXCLUDE FISH FROM ENTERING THE PROJECT AREA.
(2) NETS WILL BE SECURED TO THE STREAM CHANNEL BED AND BANKS UNTIL FISH CAPTURE AND TRANSPORT ACTIVITIES ARE COMPLETE.
(3) IF BLOCK NETS OR TRAPS REMAIN IN PLACE MORE THAN ONE DAY, THE NETS AND TRAPS WILL BE MONITORED AT LEAST DAILY TO ENSURE THEY ARE SECURED TO

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Designed L. Horning 3/20/23
Drawn L. Horning 3/20/23
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HIP III General Conservation & Implementation Measures
PA 34 Tucannon River
Columbia Conservation District

Walla Walla Engineer
Columbia Conservation District
Dayton, WA

File Name PA 34
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Sheet 2 of 12

THE BANKS AND FREE OF ORGANIC ACCUMULATION, AND TO MINIMIZE FISH PREDATION IN THE TRAP.

(4) NETS AND TRAPS WILL BE MONITORED HOURLY ANYTIME THERE IS INSTREAM DISTURBANCE.

**STEP 2: SALVAGE:** AS DESCRIBED BELOW, FISH TRAPPED WITHIN THE ISOLATED WORK AREA WILL BE CAPTURED TO MINIMIZE THE RISK OF INJURY, THEN RELEASED AT A SAFE SITE:

(1) FISH WILL BE COLLECTED BY HAND OR DIP NETS, AS THE AREA IS SLOWLY DEWATERED.

(2) SEINES WITH A MESH SIZE TO ENSURE ENTRAPMENT OF THE RESIDING ESA-LISTED FISH WILL BE USED.

(3) MINNOW TRAPS WILL BE LEFT IN PLACE OVERNIGHT AND USED IN CONJUNCTION WITH SEINING.

(4) IF BUCKETS ARE USED TO TRANSPORT FISH:

(A) THE TIME FISH ARE IN A TRANSPORT BUCKET WILL BE LIMITED, AND WILL BE RELEASED AS QUICKLY AS POSSIBLE;

(B) THE NUMBER OF FISH WITHIN A BUCKET WILL BE LIMITED BASED ON SIZE, AND FISH WILL BE OF RELATIVELY COMPARABLE SIZE TO MINIMIZE PREDATION;

(C) AERATORS FOR BUCKETS WILL BE USED OR THE BUCKET WATER WILL BE FREQUENTLY CHANGED WITH COLD CLEAR WATER AT 10 MINUTE OR MORE FREQUENT INTERVALS.

(D) BUCKETS WILL BE KEPT IN SHADED AREAS OR WILL BE COVERED BY A CANOPY IN EXPOSED AREAS.

(E) DEAD FISH WILL NOT BE STORED IN TRANSPORT BUCKETS, BUT WILL BE LEFT ON THE STREAM BANK TO AVOID MORTALITY COUNTING ERRORS.

(5) AS RAPIDLY AS POSSIBLE (ESPECIALLY FOR TEMPERATURE-SENSITIVE BULL TROUT), FISH WILL BE RELEASED IN AN AREA THAT PROVIDES ADEQUATE COVER AND FLOW REFUGE. UPSTREAM RELEASE IS PREFERRED, BUT FISH RELEASED DOWNSTREAM WILL BE SUFFICIENTLY OUTSIDE OF THE INFLUENCE OF CONSTRUCTION.

(6) SALVAGE WILL BE SUPERVISED BY A QUALIFIED FISHERIES BIOLOGIST EXPERIENCED WITH WORK AREA ISOLATION AND COMPETENT TO ENSURE THE SAFE HANDLING OF ALL FISH.

**STEP 3: ELECTROFISHING:** ELECTROFISHING WILL BE USED ONLY AFTER OTHER SALVAGE METHODS HAVE BEEN EMPLOYED OR WHEN OTHER MEANS OF FISH CAPTURE MAY NOT BE FEASIBLE OR EFFECTIVE. IF ELECTROFISHING WILL BE USED TO CAPTURE FISH FOR SALVAGE, THE SALVAGE OPERATION WILL BE LED BY AN EXPERIENCED FISHERIES BIOLOGIST AND THE FOLLOWING GUIDELINES WILL BE FOLLOWED:

(1) THE NMFS' ELECTROFISHING GUIDELINES[4] WILL BE USED

(2) ONLY DIRECT CURRENT (DC) OR PULSED DIRECT CURRENT (PDC) WILL BE USED.

(A) IF CONDUCTIVITY IS LESS THAN 100 MS, VOLTAGE RANGES FROM 900 TO 1100 V. WILL BE USED;

(B) FOR CONDUCTIVITY RANGES BETWEEN 100 TO 300 MS, VOLTAGE RANGES WILL BE 500 TO 800 V.

(C) FOR CONDUCTIVITY GREATER THAN 300 MS, VOLTAGE WILL BE LESS THAN 400 V.

(3) ELECTROFISHING WILL BEGIN WITH A MINIMUM PULSE WIDTH AND RECOMMENDED VOLTAGE AND THEN GRADUALLY INCREASE TO THE POINT WHERE FISH ARE IMMOBILIZED.

(4) THE ANODE WILL NOT INTENTIONALLY CONTACT FISH WHILE THE CURRENT IS BEING EMITTED.

(5) IF MORTALITY OR OBVIOUS INJURY (DEFINED AS DARK BANDS ON THE BODY, SPINAL DEFORMATIONS, DE-SCALING OF 25% OR MORE OF BODY, AND TORPIDITY OR INABILITY TO MAINTAIN UPRIGHT ATTITUDE AFTER SUFFICIENT RECOVERY TIME) OCCURS DURING ELECTROFISHING, OPERATIONS WILL BE IMMEDIATELY DISCONTINUED, MACHINE SETTINGS, WATER TEMPERATURE AND CONDUCTIVITY CHECKED, AND PROCEDURES ADJUSTED OR POSTPONED TO REDUCE MORTALITY.

**STEP 4: DEWATER:** DEWATERING, WHEN NECESSARY, WILL BE CONDUCTED OVER A SUFFICIENT PERIOD OF TIME TO ALLOW SPECIES TO NATURALLY MIGRATE OUT OF THE WORK AREA.

(1) DIVERSION AROUND THE CONSTRUCTION SITE MAY BE ACCOMPLISHED WITH A COFFER DAM AND AN ASSOCIATED PUMP, A BY-PASS CULVERT OR PIPE, OR A LINED, NON-ERODIBLE DIVERSION DITCH.

(2) ALL PUMPS WILL HAVE FISH SCREENS TO AVOID JUVENILE FISH ENTRAINMENT, AND WILL BE OPERATED IN ACCORDANCE WITH CURRENT NMFS FISH SCREEN CRITERIA (NMFS 2011, OR MOST RECENT VERSION). IF THE PUMPING RATE EXCEEDS 3 CFS, A NMFS HYDRO DIVISION FISH PASSAGE REVIEW WILL BE NECESSARY.

(3) DISSIPATION OF FLOW ENERGY AT THE BYPASS OUTFLOW WILL BE PROVIDED TO PREVENT DAMAGE TO RIPARIAN VEGETATION OR STREAM CHANNEL.

(4) SAFE REENTRY OF FISH INTO THE STREAM CHANNEL WILL BE PROVIDED, PREFERABLY INTO POOL HABITAT WITH COVER, IF THE DIVERSION ALLOWS FOR DOWNSTREAM FISH PASSAGE.

(5) SEEPAGE WATER WILL BE PUMPED TO A TEMPORARY STORAGE AND TREATMENT SITE OR INTO UPLAND AREAS TO ALLOW WATER TO PERCOLATE THROUGH SOIL OR TO FILTER THROUGH VEGETATION PRIOR TO REENTERING THE STREAM CHANNEL. (NMFS 2000 – HTTP://WWW.NWR.NOAA.GOV/ESA-SALMON-REGULATIONS-PERMITS/40 RULES/UPLOAD/ELECTRO2000.PDF)

**STEP 6: SALVAGE NOTICE:** ONCE SALVAGE OPERATIONS ARE COMPLETED, A SALVAGE REPORT WILL DOCUMENT PROCEDURES USED, ANY FISH INJURY OR MORTALITY (INCLUDING NUMBERS OF FISH AFFECTED), AND A DESCRIPTION OF THE CAUSES FOR MORTALITY, AS REQUIRED ON THE REPORTING FORM.

**FISH PASSAGE:** FISH PASSAGE WILL BE PROVIDED FOR ANY ADULT OR JUVENILE FISH LIKELY TO BE PRESENT IN THE ACTION AREA DURING CONSTRUCTION, UNLESS PASSAGE DID NOT EXIST BEFORE CONSTRUCTION OR THE STREAM IS NATURALLY IMPASSABLE AT THE TIME OF CONSTRUCTION. IF THE PROVISION OF TEMPORARY FISH PASSAGE DURING CONSTRUCTION WILL RESULT IN INCREASED NEGATIVE IMPACTS TO AQUATIC SPECIES OF INTEREST OR THEIR HABITAT, A VARIANCE CAN BE REQUESTED FROM THE NMFS BRANCH CHIEF AND THE USFWS FIELD OFFICE SUPERVISOR. PERTINENT INFORMATION, SUCH AS THE SPECIES AFFECTED, LENGTH OF STREAM REACH AFFECTED, PROPOSED TIME FOR THE PASSAGE BARRIER, AND ALTERNATIVES CONSIDERED, WILL BE INCLUDED IN THE VARIANCE REQUEST. AFTER CONSTRUCTION, ADULT AND JUVENILE PASSAGE THAT MEETS NMFS' FISH PASSAGE CRITERIA (NMFS 2011C) WILL BE PROVIDED FOR THE LIFE OF THE ACTION.

**CONSTRUCTION AND DISCHARGE WATER:**

1) SURFACE WATER MAY BE DIVERTED TO MEET CONSTRUCTION NEEDS, BUT ONLY IF DEVELOPED SOURCES ARE UNAVAILABLE OR INADEQUATE.
2) DIVERSIONS WILL NOT EXCEED 10% OF THE AVAILABLE FLOW.
3) ALL CONSTRUCTION DISCHARGE WATER WILL BE COLLECTED AND TREATED USING THE BEST AVAILABLE TECHNOLOGY APPLICABLE TO SITE CONDITIONS.
4) TREATMENTS TO REMOVE DEBRIS, NUTRIENTS, SEDIMENT, PETROLEUM HYDROCARBONS, METALS AND OTHER POLLUTANTS LIKELY TO BE PRESENT WILL BE PROVIDED.

**MINIMIZE TIME AND EXTENT OF DISTURBANCE:** EARTHWORK (INCLUDING DRILLING, EXCAVATION, DREDGING, FILLING AND COMPACTING) IN WHICH MECHANIZED EQUIPMENT IS IN STREAM CHANNELS, RIPARIAN AREAS, AND WETLANDS WILL BE COMPLETED AS QUICKLY AS POSSIBLE. MECHANIZED EQUIPMENT WILL BE USED IN STREAMS ONLY WHEN PROJECT SPECIALISTS BELIEVE THAT SUCH ACTIONS ARE THE ONLY REASONABLE ALTERNATIVE FOR IMPLEMENTATION, OR WOULD RESULT IN LESS SEDIMENT IN THE STREAM CHANNEL OR DAMAGE (SHORT- OR LONG-TERM) TO THE OVERALL AQUATIC AND RIPARIAN ECOSYSTEM RELATIVE TO OTHER ALTERNATIVES. TO THE EXTENT FEASIBLE, MECHANIZED EQUIPMENT WILL WORK FROM THE TOP OF THE BANK, UNLESS WORK FROM ANOTHER LOCATION WOULD RESULT IN LESS HABITAT DISTURBANCE.

**CESSATION OF WORK:** PROJECT OPERATIONS WILL CEASE UNDER THE FOLLOWING CONDITIONS:

1) HIGH FLOW CONDITIONS THAT MAY RESULT IN INUNDATION OF THE PROJECT AREA, EXCEPT FOR EFFORTS TO AVOID OR MINIMIZE RESOURCE DAMAGE;
2) WHEN ALLOWABLE WATER QUALITY IMPACTS, AS DEFINED BY THE 401 WATER QUALITY CERTIFICATION, HAVE BEEN EXCEEDED.

**OBLITERATION:** WHEN THE PROJECT IS COMPLETED, THE CONTRACTOR WILL OBLITERATE ALL TEMPORARY ACCESS ROADS, CROSSINGS, AND STAGING AREAS OBLITERATED, AND WILL STABILIZE THE SOILS STABILIZED AND REVEGETATE. WHEN NECESSARY, LOOSEN COMPACTED AREAS, SUCH AS ACCESS ROADS, STREAM CROSSINGS, STAGING, AND STOCKPILE AREAS TO ALLOW FOR REVEGETATION AND IMPROVED INFILTRATION.

**SITE RESTORATION:** WHEN CONSTRUCTION IS COMPLETE:

1) ALL STREAMBANKS, SOILS, AND VEGETATION WILL BE CLEANED UP AND RESTORED AS NECESSARY USING STOCKPILED LARGE WOOD, TOPSOIL, AND NATIVE CHANNEL MATERIAL.
2) ALL PROJECT RELATED WASTE WILL BE REMOVED.
3) ALL DISTURBED AREAS WILL BE REHABILITATED IN A MANNER THAT RESULTS IN SIMILAR OR IMPROVED CONDITIONS RELATIVE TO PRE-PROJECT CONDITIONS. THIS WILL BE ACHIEVED THROUGH REDISTRIBUTION OF STOCKPILED MATERIALS, SEEDING, AND/OR PLANTING WITH LOCAL NATIVE SEED MIXES OR PLANTS.

**REVEGETATION:** LONG-TERM SOIL STABILIZATION OF THE DISTURBED SITE WILL BE ACCOMPLISHED WITH RE-ESTABLISHMENT OF NATIVE VEGETATION USING THE FOLLOWING CRITERIA:

1) PLANTING AND SEEDING WILL OCCUR PRIOR TO OR AT THE BEGINNING OF THE FIRST GROWING SEASON AFTER CONSTRUCTION.
2) IN APPROPRIATE MIX OF SPECIES THAT WILL ACHIEVE ESTABLISHMENT, SHADE, AND EROSION CONTROL OBJECTIVES, PREFERABLY FORB, GRASS, SHRUB, OR TREE SPECIES NATIVE TO THE PROJECT AREA OR REGION AND APPROPRIATE TO THE SITE WILL BE USED.
3) VEGETATION, SUCH AS WILLOW, SEDGE AND RUSH MATS, WILL BE SALVAGED FROM DISTURBED OR ABANDONED FLOODPLAINS, STREAM CHANNELS, OR WETLANDS TO BE REPLANTED DURING SITE RESTORATION.
4) INVASIVE SPECIES WILL NOT BE USED.
5) SHORT-TERM STABILIZATION MEASURES MAY INCLUDE THE USE OF NON-NATIVE STERILE SEED MIX (WHEN NATIVE SEEDS ARE NOT AVAILABLE), WEED-FREE CERTIFIED STRAW, JUTE MATTING, AND OTHER SIMILAR TECHNIQUES.
6) SURFACE FERTILIZER WILL NOT BE APPLIED WITHIN 50-FEET OF ANY STREAM CHANNEL, WATERBODY, OR WETLAND.
7) FENCING WILL BE INSTALLED AS NECESSARY TO PREVENT ACCESS TO REVEGETATED SITES BY LIVESTOCK OR UNAUTHORIZED PERSONS.
8) RE-ESTABLISHMENT OF VEGETATION IN DISTURBED AREAS WILL ACHIEVE AT LEAST 70% OF PRE- PROJECT CONDITIONS WITHIN 3-YEARS.
9) INVASIVE PLANTS WILL BE REMOVED OR CONTROLLED UNTIL NATIVE PLANT SPECIES ARE WELL ESTABLISHED (TYPICALLY 3-YEARS POST-CONSTRUCTION).

**SITE ACCESS:** THE PROJECT SPONSOR WILL RETAIN THE RIGHT OF REASONABLE ACCESS TO THE SITE, SUCH THAT THE PROJECT SPONSOR CAN MONITOR THE SUCCESS OVER THE LIFE OF THE PROJECT.

**VARIANCE REQUESTS:** BECAUSE OF THE WIDE RANGE OF PROPOSED ACTIVITIES AND THE NATURAL VARIABILITY WITHIN AND BETWEEN STREAM SYSTEMS, BPA (ON BEHALF OF THE APPLICANT) MAY REQUIRE VARIATIONS FROM CRITERIA SPECIFIED HEREIN. NMFS WILL CONSIDER GRANTING VARIANCES, ESPECIALLY WHEN THERE IS A CLEAR CONSERVATION BENEFIT OR THERE ARE NO ADDITIONAL ADVERSE EFFECTS (ESPECIALLY INCIDENTAL TAKE) BEYOND THAT COVERED BY THE OPINION. MINOR VARIANCES CAN BE AUTHORIZED BY THE NMFS BRANCH CHIEF.

VARIANCE REQUESTS MAY BE SUBMITTED AND APPROVED BY EMAIL CORRESPONDENCE AND WILL INCLUDE:

1) NAME AND BRIEF DESCRIPTION OF PROJECT, LOCATION OF PROJECT AND 8TH FIELD HUC NUMBER.
2) DEFINE THE REQUESTED VARIANCE AND THE RELEVANT CRITERION BY PAGE NUMBER.
3) CURRENT ENVIRONMENTAL CONDITIONS (CURRENT FLOW AND WEATHER CONDITIONS).
4) BIOLOGICAL JUSTIFICATION AS TO WHY A VARIANCE IS NECESSARY AND A BRIEF RATIONALE WHY THE VARIANCE WILL EITHER PROVIDE A CONSERVATION BENEFIT OR, AT A MINIMUM, NOT CAUSE ADDITIONAL ADVERSE EFFECTS BEYOND THE SCOPE OF THE OPINION.
5) INCLUDE AS ATTACHMENTS ANY NECESSARY APPROVALS BY STATE AGENCIES.

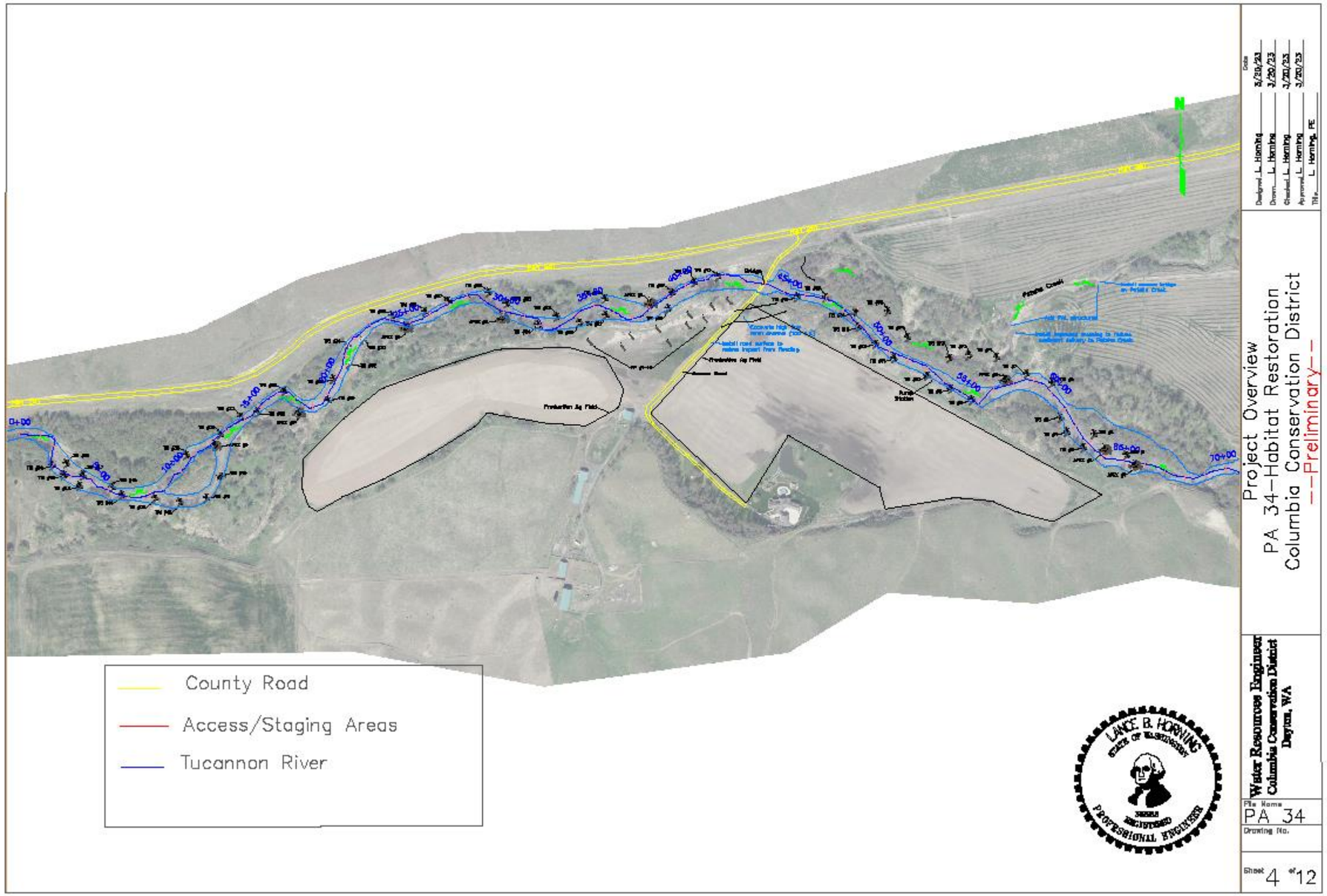
LANCE B. HORNING
STATE OF WASHINGTON
36585
REGISTERED
PROFESSIONAL ENGINEER

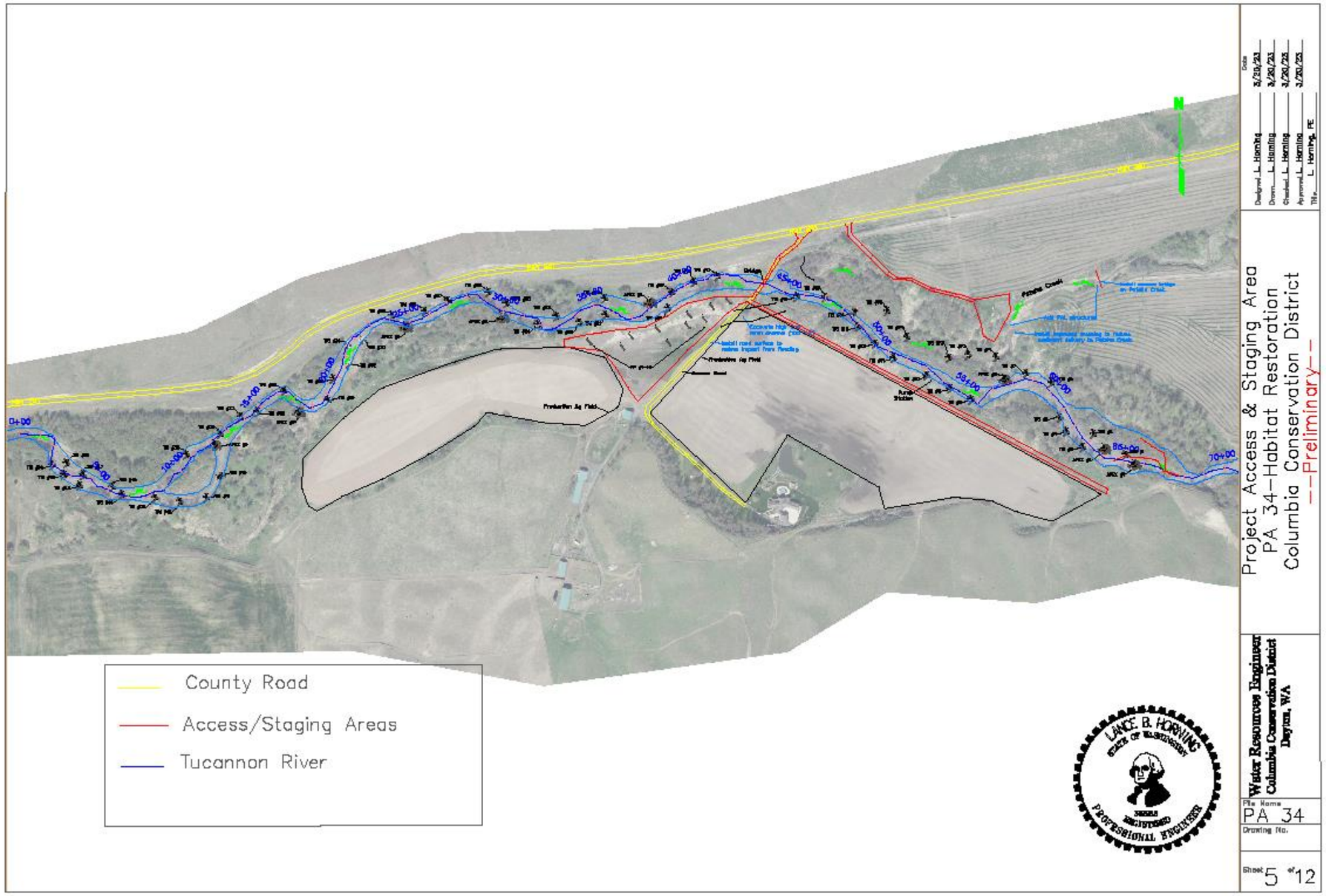
Date
Designed L. Horning 3/29/23
Drawn L. Horning 3/29/23
Checked L. Horning 3/29/23
Approved L. Horning 3/29/23
Title L. Horning, PE

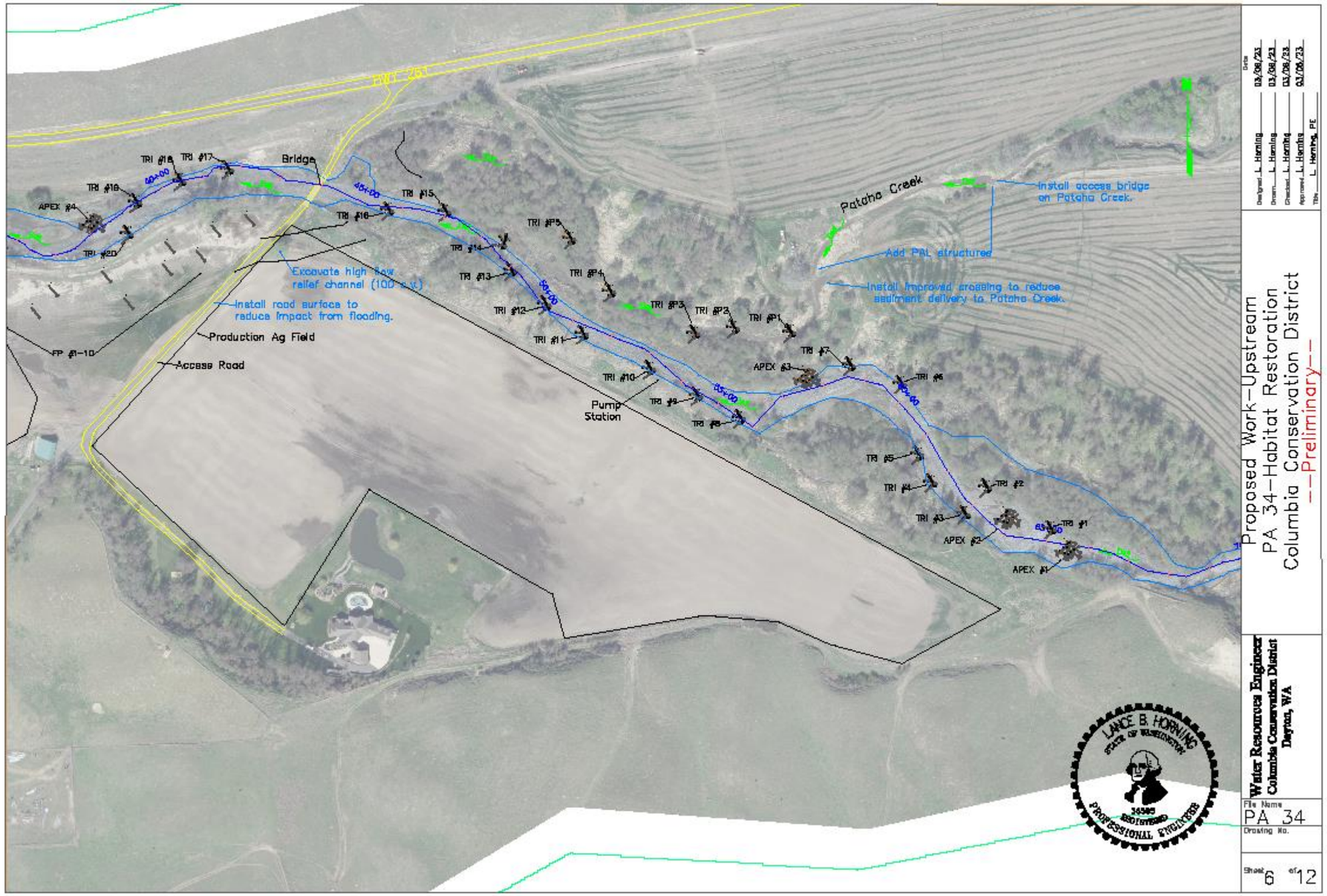
HIP III General Conservation & Implementation Measures
PA 34 Tucannon River
Columbia Conservation District

Water Resources Engineer
Columbia Conservation District
Dayton, WA

File Name PA 34
Drawing No.
Sheet 3 of 12


County Road
Access/Staging Areas
Tucannon River
Project Overview
PA 34–Habitat Restoration
Columbia Conservation District
--Preliminary--
Water Resources Engineer
Columbia Conservation District
Dayton, WA
File Name
PA 34
Drawing No.
Sheet 4 of 12


County Road
Access/Staging Areas
Tucannon River
Project Access & Staging Area
PA 34–Habitat Restoration
Columbia Conservation District
--Preliminary--
Water Resource Engineer
Columbia Conservation District
Dayton, WA
PA 34
Sheet 5 of 12


HWY 261
Bridge
Pataha Creek
Install access bridge on Pataha Creek.
Add PAL structures
Install improved crossing to reduce sediment delivery to Pataha Creek.
Excavate high flow relief channel (100' +/-)
Install road surface to reduce impact from flooding.
Production Ag Field
Access Road
Pump Station
APEX #4
APEX #3
APEX #2
APEX #1
FP #1-10
TRI #1
TRI #2
TRI #3
TRI #4
TRI #5
TRI #6
TRI #7
TRI #8
TRI #9
TRI #10
TRI #11
TRI #12
TRI #13
TRI #14
TRI #15
TRI #16
TRI #17
TRI #18
TRI #19
TRI #20
TRI #P1
TRI #P2
TRI #P3
TRI #P4
TRI #P5
60+00
45+00
65+00
85+00
Proposed Work-Upstream
PA 34-Habitat Restoration
Columbia Conservation District
--Preliminary--
Water Resources Engineer
Columbia Conservation District
Dayton, WA
LANCE B. HORNING
STATE OF WASHINGTON
36585
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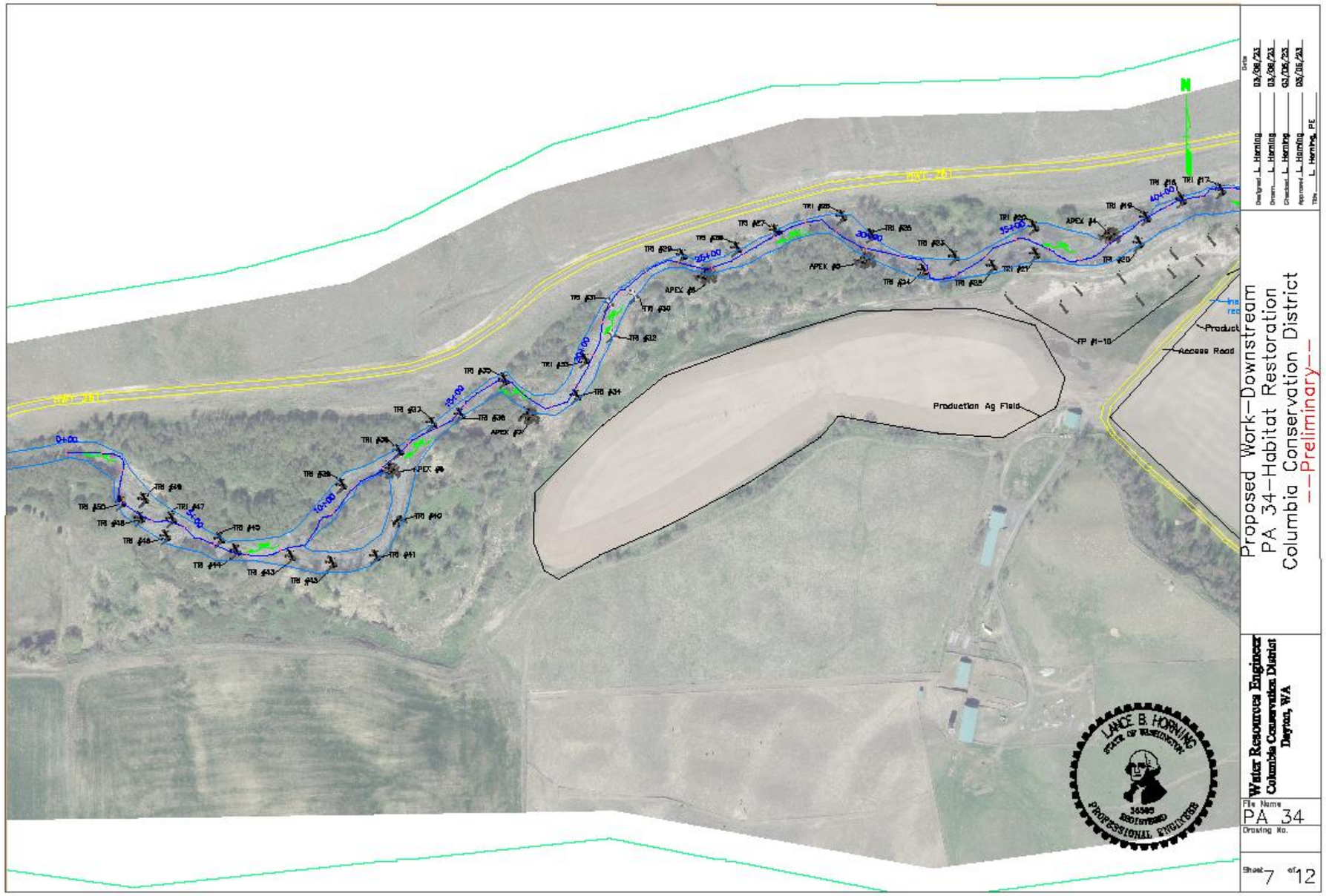
PROFESSIONAL ENGINEER
File Name
PA 34
Drawing No.
Sheet 6 of 12


N
Production Ag Field
Access Road
FP #1-10
APEX #4
APEX #5
APEX #6
APEX #7
APEX #8
APEX #9
0+00
10+00
20+00
30+00
35+00
40+00
Proposed Work-Downstream
PA 34-Habitat Restoration
Columbia Conservation District
--Preliminary--
Water Resources Engineer
Columbia Conservation District
Dayton, WA
File Name
PA 34
Drawing No.
Sheet 7 of 12
LANCE B. HORNING
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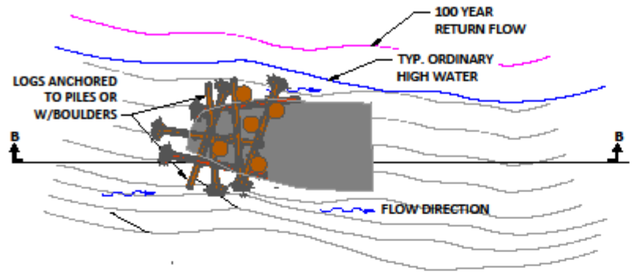


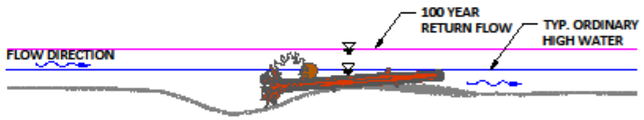

APEX TYPICAL PLAN

CONSTRUCTION NOTES:
1. APEX LWD WILL BE FIELD LOCATED AT TIME OF CONSTRUCTION BY THE ENGINEER.
2. STRUCTURE ANCHORING IS ACHIEVED BY UTILIZING EXISTING TREES, REBAR PINS, ROCK BALLAST AND BURIAL AS DIRECTED BY ENGINEER.
3. IF STRUCTURE ANCHORING IS ACHIEVED BY BURIAL THEN A TRENCH SHALL BE EXCAVATED FOR PROPER PLACEMENT AND BACKFILLED TO EXISTING GRADE. EXCESS MATERIAL SHALL BE PLACED IN LEE OF STRUCTURE..
4. PRIMARY STRUCTURAL MEMBERS ARE SHOWN. ADDITIONAL SLASH AND SMALL MEMBERS MAY BE ADDED.

| LWD QUANTITIES | | | | |
|---|---|---|---|---|
| ITEM | LOG DIA. (IN.) | ROOTWAD DIA. (IN.) | MIN. LOG LENGTH (FT) | QUANTITY |
| ROOTWAD LOG | 18" | 54" | 35' | 7 |
| SLASH | 10 CY | | | |

| ANCHOR QUANTITIES | | | | |
|---|---|---|---|---|
| ITEM | DIA. (In.) | Length (ft.) | Number | |
| Pile | 14 | 20 | 7 | |

TABLE NOTES:
1. MINIMUM LENGTHS ARE REPORTED FOR MATERIAL PROCUREMENT PURPOSES. ALL LWM SHALL BE CUT TO FIT IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS.
2. ROOTWAD LOG LENGTHS DO NOT INCLUDE THE LENGTH OF THE ROOTWAD MASS.
3. ROOTWAD LOG DIAMETER IS MEASURED AT THE BREAST HEIGHT.
4. LOG POLE DIAMETER IS MEASURED A T THE MID POINT ALONG THE LENGTH OF THE LOG.




8 APEX TYPICAL SECTION

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Date
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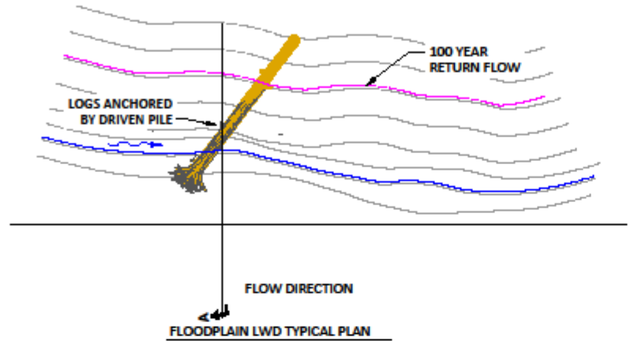
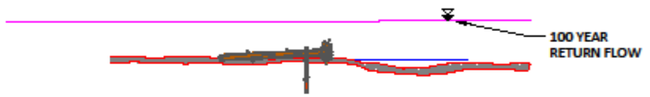
APEX LWD
PA 34–Habitat Restoration
Columbia Conservation District
—Preliminary—

Water Resources Engineer
Columbia Conservation District
Dayton, WA

File Name PA 34
Drawing No.
Sheet 8 of 12

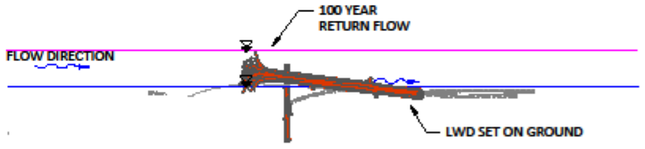



FLOODPLAIN LWD TYPICAL PLAN




A FLOODPLAIN LWD TYPICAL SECTION

CONSTRUCTION NOTES:
1. FLOODPLAIN LWD WILL BE FIELD LOCATED AT TIME OF CONSTRUCTION BY THE ENGINEER.
2. STRUCTURE ANCHORING IS ACHIEVED BY A SINGLE PILE.




B FLOODPLAIN LWD TYPICAL SECTION

| LWD QUANTITIES | | | | |
|---|---|---|---|---|
| ITEM | LOG DIA. (IN.) | ROOTWAD DIA. (IN.) | MIN. LOG LENGTH (FT) | QUANTITY |
| ROOTWAD LOG | 18" | 54" | 35' | 1 |
| | | | | |
| SLASH | | | | |

| ANCHOR QUANTITIES | | | | |
|---|---|---|---|---|
| ITEM | DIA. (in.) | Length (ft.) | Number | |
| Pile | 14 | 8 | 1 | |

TABLE NOTES:
1. MINIMUM LENGTHS ARE REPORTED FOR MATERIAL PROCUREMENT PURPOSES. ALL LWD SHALL BE CUT TO FIT IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS.
2. ROOTWAD LOG LENGTHS DO NOT INCLUDE THE LENGTH OF THE ROOTWAD MASS.
3. ROOTWAD LOG DIAMETER IS MEASURED AT THE BREAST HEIGHT.

LANCE B. HORNING STATE OF WASHINGTON 36568 REGISTERED PROFESSIONAL ENGINEER

Date
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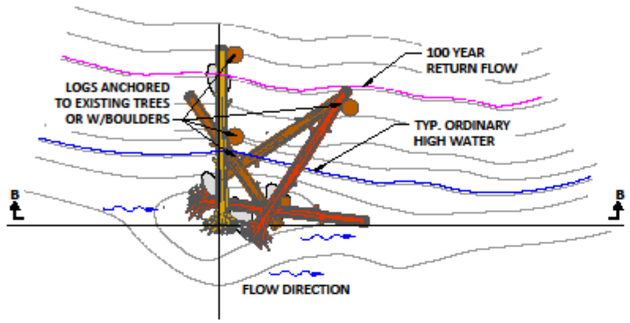
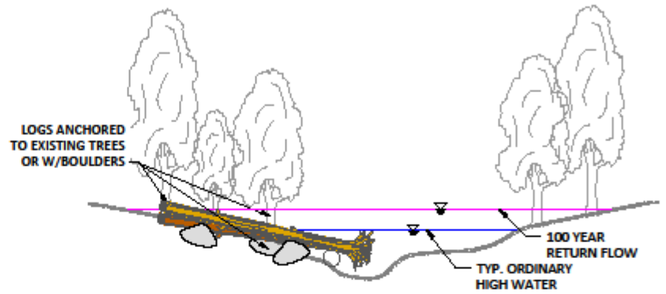
Floodplain LWD
PA 34 Tucannon River
Columbia Conservation District
--Preliminary--

Water Resources Engineer
Columbia Conservation District
Dayton, WA

File Name PA 34
Drawing No.
Sheet 9 of 12




TRI LWD TYPICAL PLAN



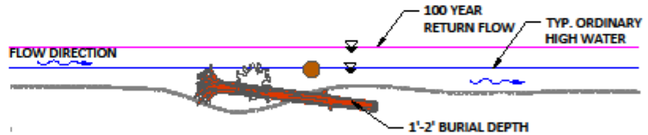

A TRI LWD TYPICAL SECTION

CONSTRUCTION NOTES:
1. TRI LWD WILL BE FIELD LOCATED AT TIME OF CONSTRUCTION BY THE ENGINEER.
2. STRUCTURE ANCHORING IS ACHIEVED BY UTILIZING EXISTING TREES, REBAR PINS, PILES AND BURIAL AS DIRECTED BY ENGINEER.
3. IF STRUCTURE ANCHORING IS ACHIEVED BY BURIAL THEN A TRENCH SHALL BE EXCAVATED FOR PROPER PLACEMENT AND BACKFILLED TO EXISTING GRADE. EXCESS MATERIAL SHALL BE PLACED IN LEE OF STRUCTURE..
4. PRIMARY STRUCTURAL MEMBERS ARE SHOWN. ADDITIONAL SLASH AND SMALL MEMBERS MAY BE ADDED.

| LWD QUANTITIES | | | | |
|---|---|---|---|---|
| ITEM | LOG DIA. (IN.) | ROOTWAD DIA. (IN.) | MIN. LOG LENGTH (FT) | QUANTITY |
| ROOTWAD LOG | 18" | 54" | 35' | 3 |
| LOG POLE | 18" | | 35' | 2 |
| SLASH | 5 CY. | | | |

| ANCHOR QUANTITIES | | | | |
|---|---|---|---|---|
| ITEM | DIA. (In.) | Length (ft.) | Number | |
| Pile | 14 | 20 | 4 | |

TABLE NOTES:
1. MINIMUM LENGTHS ARE REPORTED FOR MATERIAL PROCUREMENT PURPOSES. ALL LWD SHALL BE CUT TO FIT IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS.
2. ROOTWAD LOG LENGTHS DO NOT INCLUDE THE LENGTH OF THE ROOTWAD MASS.
3. ROOTWAD LOG DIAMETER IS MEASURED AT THE BREAST HEIGHT.
4. LOG POLE DIAMETER IS MEASURED A T THE MID POINT ALONG THE LENGTH OF THE LOG.




B TRI LWD TYPICAL SECTION

LANCE B. HORNING
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38585
REGISTERED
PROFESSIONAL ENGINEER

Date
Designed L. Horning 3/20/23
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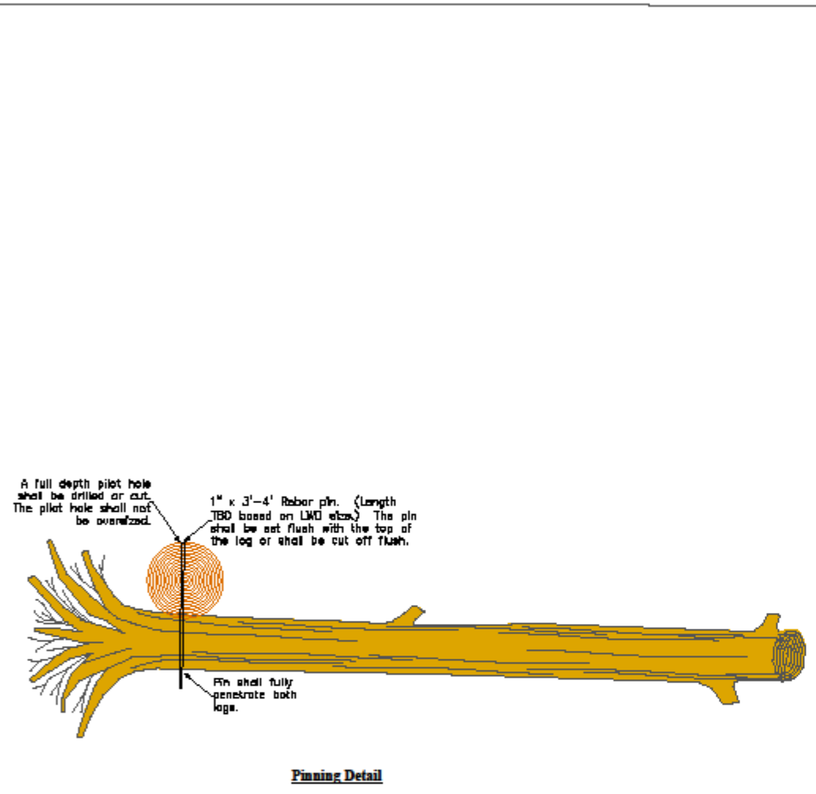
Checked L. Horning 3/20/23
Approved L. Horning 3/20/23
Title L. Horning, PE

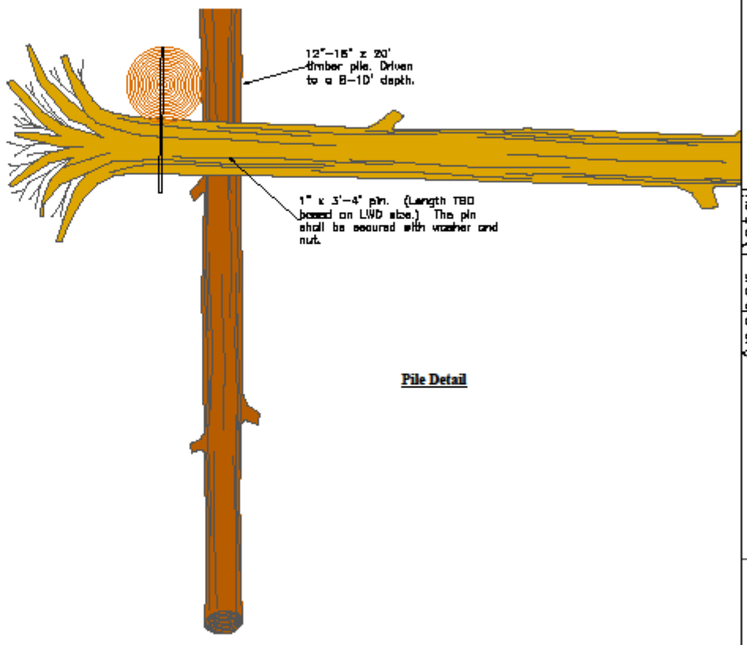
TRI LWD
PA 34 Tucannon River
Columbia Conservation District
—Preliminary—

Water Resources Engineer
Columbia Conservation District
Dayton, WA

File Name PA 34
Drawing No.
Sheet 10 of 12




Pinning Detail




Pile Detail

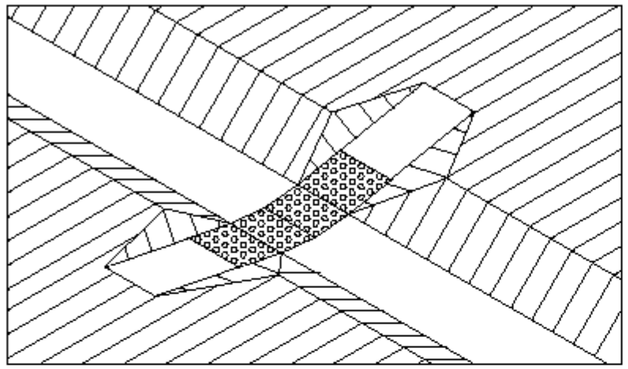
LANCE B. HORNING
STATE OF WASHINGTON
36555
REGISTERED
PROFESSIONAL ENGINEER

Anchor Detail
PA 34 Tucannon River
Columbia Conservation District
--Preliminary--

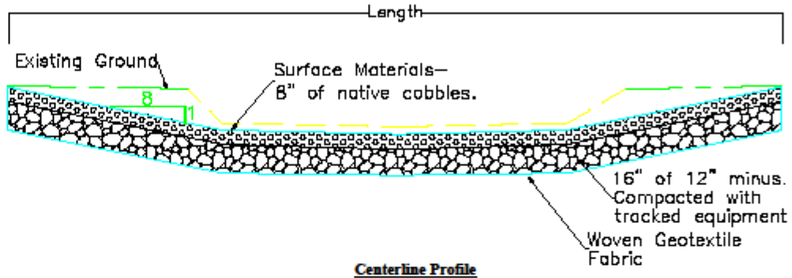
| | |
|---|---|
| Designed | L. Horning |
| Drawn | L. Horning |
| Checked | L. Horning |
| Approved | L. Horning |
| Title | L. Horning PE |
| Date | 3/20/23 |
| | 3/20/23 |
| | 3/20/23 |
| | 3/20/23 |

Water Resources Engineer
Columbia Conservation District
Dayton, WA

File Name PA 34
Drawing No.
Sheet 11 of 12



**Plan View**

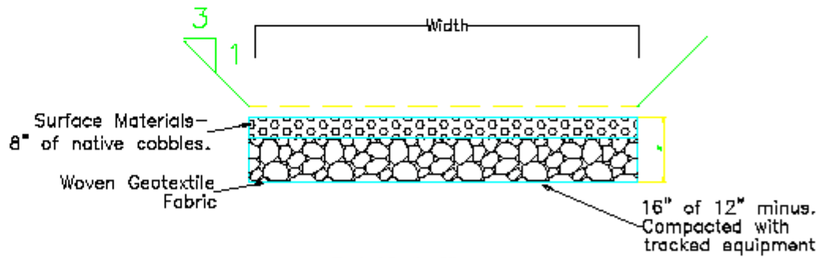



**Centerline Profile**

| CROSSING INFORMATION | | | | |
|---|---|---|---|---|
| Items | Length (ft) | Width (ft) | Rock Quantity (CY) | Rock Quantity (Tons) |
| | | | | |
| Crossing #1 | 100 | 15 | 50 | 80 |
| | | | | |
| | | | | |
| | | | | |

CONSTRUCTION NOTES:

1. Crossing surface shall be set at the existing bed elevation.
2. If flowing water is present the crossing shall be isolated and dewatered .




**Typical Section View**

LANCE B. HORNING
STATE OF WASHINGTON
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Date
Designed L. Horning 3/20/23
Drawn L. Horning 3/20/23
Checked L. Horning 3/20/23
Approved L. Horning 3/20/23
Title L. Horning, PE

Improved Crossing
PA 34 Tucannon River
Columbia Conservation District
--Preliminary--

Water Resources Engineer
Columbia Conservation District
Dayton, WA

File Name
PA 34
Drawing No.
Sheet 12 of 12